

COLLABORATION IN THE SUPPLY CHAIN OF ROAD SAFETY SYSTEM DIVISION (RSSD) AT TITAN INDONESIA TO IMPROVE EFFECTIVENESS AND EFFICIENCY OPERATIONAL PERFORMANCE

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Abstract – The purpose of this paper is to give the root cause and several strategies as a business solution to improve RSS division performance with creating a good business model and strategy of supply chain operation in terms of effectiveness and efficiency of business process division, to improve its operational performance in order to meet its customer needs and wants. By using The Porter's 5 Forces analysis to examine the fundamental characteristics and structures. Five forces model of Porter is a framework for evaluating the industrial structure (business threats and opportunities) according to: the effects of rivalry, threat of entry, supplier's power, buyer's power, and threat of substitutes. The business issues exploration will be carried out by reviewing inbound supply chain, outbound supply chain, and business process. The root cause analysis of this case study was carried out to illustrate the applicability of the framework. The findings show that adoption of collaboration in supply chain concept facilitates the chain members to have a broader view to develop and ensure an effective collaboration. The analysis would only cover the time period of 2010 to 2012 as the past data because of the age of the existing division; The analysis only covers in-depth operational performance optimization strategy related to business channels performance that affects the RSSD profitability. The concept of Supply Chain Collaboration can be used by the chain members in the discussion forum to (re)design appropriate settings of the five elements of the architecture that lead to better overall performance.

Keywords: Collaborative Supply Chain System, Information Sharing, Incentive Alignment, Decision Synchronization, and Innovative Supply Chain Processes.

I. INTRODUCTION

The economic is growing related to the infrastructure spending from the government

funds. Based on Indonesia Infrastructure Development Planning 2011 – 2015, there are some sectors that will be focused by the Government such as water treatments, road facilities, bridges, road safety, and energies.

Road Safety industries provide all products related to traffic safety products and services. Safety transportation is also related to the volume of vehicles. The development of The Road Safety Industries comes from several aspects that are influenced by various demands from external and internal environments.. One of the most contrary demands is to increase company profits and operational sustainability.

The Company Profile

Titan is fundamentally a science-based company. Titan has been operating in Indonesia since 1975. Like many other Titan subsidiaries around the world, it was established to bring the wide range of Titan products and services to the local marketplace. The original manufacturing facility was located in Cibinong but this was relocated to a new manufacturing facility in Tambun - Bekasi in 1980. Sales and Administration offices were located in Jakarta's Central Business District up until 1998 when these offices were consolidated with the Bekasi factory site. There is also a Branch Sales Office located in Surabaya. Titan corporate values are: Satisfying our customers with superior quality value and services; Providing our customers and shareholders return through sustained high quality growth;

Respecting the social and physical environments; Being a Company that employees are proud to be part of.

The Company History

Titan was founded in 1902 in the Lake Superior town of two Harbors, Minnesota. Five businessmen set out to mine a mineral deposit for grinding-wheel abrasives. But the deposits proved to be of little value, and the new Titan Co. quickly moved to nearby Duluth in 1905 to focus on sandpaper products. Years of struggle ensued until the company could master the quality of production and supply chains. New investors attracted to Titan, such as Lucius Ordway, who moved the company to St. Paul in 1910. Early technical and marketing innovations began to produce successes and, in 1916, the company paid its first dividend of 6 cents a share.

Road Safety System Division PT. Titan Indonesia

Road Safety System Division is one of 46 divisions operating in Titan Indonesia. Road Safety System Division is a new division, established in 2007. Nowadays, Road Safety System Division still has a small number of annual sales, scattered business operation, already hired 2 people in 2011 (business development & technical engineer), and need to create a good business model and supply chain operations in terms of effectiveness and efficiency of business process division.



Figure 1. Organizational Structure of Road Safety System Division PT. Titan Indonesia 2012
(Source: RSSD Titan Indonesia, 2012)

Division Business Activities

Basically, the products provided by Road Safety System Division Titan Indonesia consists of 3 main products. The first is traffic sign reflective material products, the second is pavement marking products, and the third is vehicle

marking products. To serve its customers, RSSD – Titan Indonesia provides several standard and quality. To support the RSSD services delivery, RSSD support by other functions, Supply Chain Department, Legal Department, IT Department, Human Resources Department, Finance Department, and Market Center (Collaboration marketing Program Purposed).

Division Products

RSSD Division has several products which are : Traffic Sign Reflective Material Products (RSSD have several categories that separated into 3 Tiers of products: Tier A product, Tier B product, tier C product); Pavement Marking Products (tapes marking and raised pavement marking), and Vehicle marking Products (highly reflective and pre-coated products).

II. BUSINESS ISSUE EXPLORATION

Business Issue

A small number of annual sales, less customer satisfaction related to the product availability in the market, and a small number of team to execute the business plan is the main problem in Road Safety System Division.

Operation Management Main Objective

The objective of operations management is to create effectiveness and efficiency of a business process. The relationship between channels is the top priority to maximize the effectiveness and efficiency of business process. By using a collaboration system, the firm can reduce ineffective processes, gaps, better forecasting, and improve time to market the products. The firm also must determine a plan related to the execution by timeline. How to use the resource in terms of distribution system, managing the level of customer satisfaction, and raise awareness of operations as a significant competitive strategy to win in the marketplace.

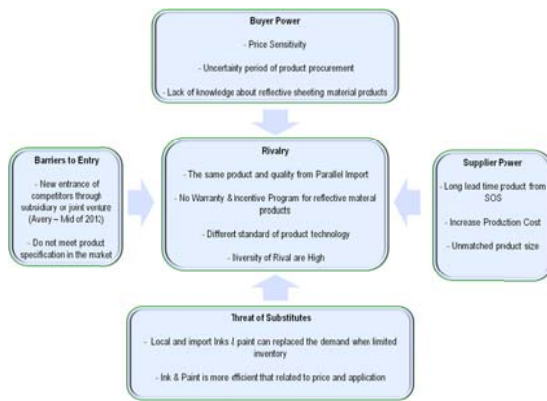


Figure 2. Conceptual Framework
(Source: Analysis, 2012)



Figure 3. RSSD Supply Chain Activities
(Source: Titan Indonesia, 2012)

Inbound Supply Chain

Related to inbound supply chain activities in RSS division, there are several points to explore as follows: Source of Supply (100% of RSS division products are imported from United States, India, Germany, and Malaysia. Product of Malaysia has a high contract price (Inter subsidiary price) but low taxes (0%). In terms of placing the order to the SOS, the problem is the high price influenced by the contract price and the tax and also the lack of commitment due to the shipment time especially SOS from India (nearly 5 months – estimated warehouse); Product Lead Time (SOS from the United States has a long lead time but low in price.

Division placed a purchase order to the SOS will spend 2.5 months if shipment by sea freight and 1 month by air freight. The shipment from Malaysia is cheaper and shorter time with only 3 weeks by air freight); Order System to SOS The SKU's of RSSD products has three order categories (Stock item product, Business requirement product, Customer requirement

product); Titan Product (There is one big competitor in the market that has a cheaper product than RSSD product, do not meet product specification in the market); Inventory Management

NWI are defined as inventories that do not add value to Titan target (defined by the Division).

Table 1. Product Inventory Categories
(Source: Titan Indonesia, 2012)

Definitions	Finished Good, Raw Material, Packaging	Spare Parts
Dead Inventory	Inventory with no usage in over six (6) months	Inventory with no usage in over 24 months is 100% dead inventory
Excess Inventory	Inventory with more than 12 months of stock on hand prior to the review	Inventory with no usage in 13-24 months is 100% excess inventory
Slow Moving Inventory	Inventory with 7-12 months of stock	Inventory with no usage in 7-12 months is 100% slow moving inventory.

The problem occurs in inventory performance of RSS division with an average of 3.51 (MTD April 2012) and the target is 5.8 for 2012. The inventory turn of division has shown bad performance. The slowed moving SKU is increased in April (18 SKU's from total 260 SKU's). The NWI is also increased with the value of \$ 23.064 in the mid of May. Due to many orders have been delayed from the SOS, the inventory in May also has increased rapidly with a value of \$ 253.061 (the value is sufficient to achieve the plan of operation 3 months ahead).

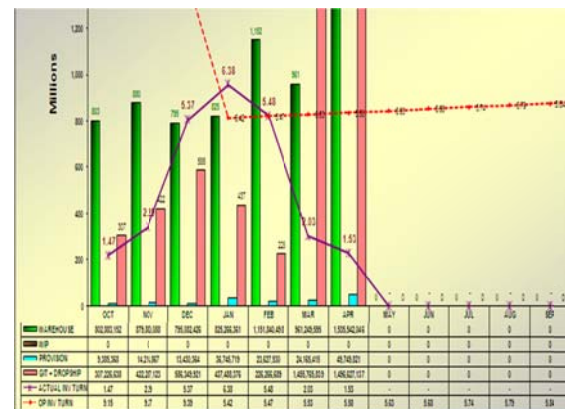


Figure 4. Inventory Turn of RSSD Titan Indonesia
(Source: RSSD Titan Indonesia, 2012)

efficient due to less of scrap in terms of sign production.

- The same product and quality from Parallel Import.

Root Cause Analysis

After Road Safety System Division Titan Indonesia's business issues exploration related to Inbound Supply Chain activities, Outbound Supply Chain activities and Business Process review have been completed, this section will analyze the root cause problem of RSSD operational performance. The business process review is designed in Figure 7.

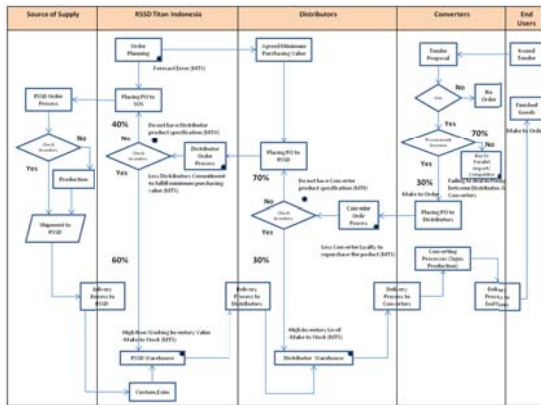


Figure 7. Business Process Review of RSSD Titan Indonesia
(Source: Analysis and RSSD Data ,Titan Indonesia, 2012)

From the Business Process above, there are several findings, which are as follows:

- From Inbound Supply Chain activities, RSSD have high inventory value related to make to stock inventory and need to improve the business operation system and forecast error. The inventory performance shows bad performance until May 2012 with NWI value has increase in the level of 9% of total inventory value. From distributor order process, 60% can fulfill from RSSD warehouse but with small number of sales due to lack of distributor commitment to fulfill minimum purchasing value and 40% order have to waiting due to order to SOS.

- From Outbound Supply Chain activities, distributors have high inventory level because only 30% of Purchase Order can be fulfilling from inventory. Less converter loyalty to repurchase the product not only because of lack of product availability but

also failing to deal in pricing between distributors and converters.

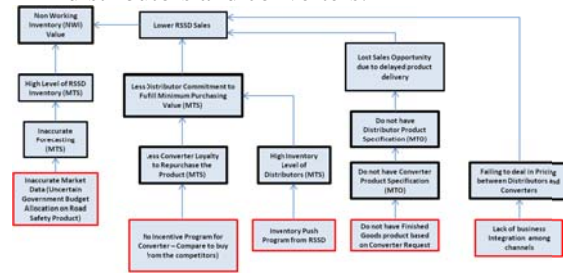


Figure 8. Root Cause Analysis Diagram
(Source: Analysis, 2012)

III. BUSINESS SOLUTION

From those findings and in depth interview with RSSD team members, it can be concluded that the root cause of RSSD's problem are incorrect market data, no incentive program for converter, inventory push program from RSSD, depend on project based business, and bad business model so it causing inefficiency business activities and make some loss of business opportunity. This condition then becomes a challenge for the RSSD in order to increase division competitive advantage against its competitors. A complete diagram showing the root cause of RSSD's business issue and actions that should be taken is presented in Figure 8.

Business Solution Formulation Framework

Adopting the supply chain collaboration framework, RSSD business solution would be divided into several stages: Develop collaborative performance system for all chain members, Determine the information that should be share between chain members, Develop joint decision making between chain members, Determine the incentive alignment system to motivate all chain members, Develop efficiency and effectiveness supply chain process between chain members.

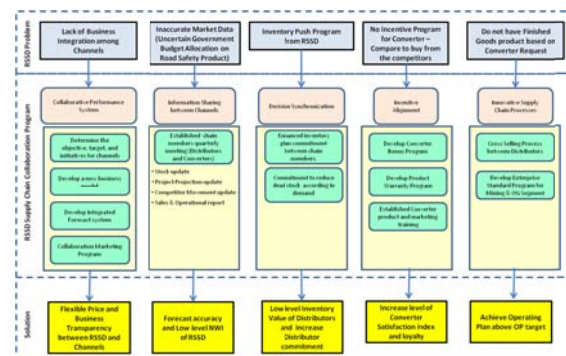


Figure 9. Proposed Solution Formulation Framework (Proposed, 2012)

Develop Collaborative Performance System

Collaborative Performance System can be defined as the process of devising and implementing performance metrics and targets that guide the chain members to assess and improve both overall performance and individual performance. The collaborative objective reflects the competitive factors that can be attained if the chain members build collaboration.

To define RSSD collaborative performance system between chain members, there are several things that should be taken. The first is determine the objective, target, and initiative of collaboration itself. The second is developing a business model that can adopt all chain members concern. The third is developing integrated forecast tools to maintain and monitor chain member performance. And the last is developing collaboration marketing program to execute the market. The metric of supply chain collaborative performance system is designed in the following table (Table 5).

Table 5. Metric of Supply Chain Collaborative Performance System (Proposed, 2012)

Objectives	Measurement	Target	Initiatives	Responsibilities
Growth Revenue	Operating Profit	2.5 times greater than 2011	Operational Excellence	RSSD
Profitability	COA	20% from Revenue		
Effective Cash Flow Management	Operating Cost	20% from Revenue		
Enhanced the Market Share	Tier A Product Growth	3 times greater than 2011	Micro-Demo Program, Trial Program, Specification Development	RSSD, Distributors, Converters
	Tier B Product Growth	4 times greater than 2011		
	Collaboration Marketing Program	Number of Event		
Chain Members Commitment	Enterprise Standard Program	Number of Project	Doing Assessment, Design, and Implementation	RSSD, Distributors, Converters
	Inventory Plan Commitment	Based on Distributor Agreement		
	Business Plan Commitment	Monthly Mapping Target		
Customer Loyalty	Customer Satisfaction Survey	4.0 service index	Purchase Order and Monthly Stock Report	RSSD
			Project Projection Update	
			Corporate Movement Update	
Customer Loyalty	Customer Satisfaction Survey	4.0 service index	Monthly Sales & Operational Report	RSSD
			Inter distributor Price	
			Product Warranty Program	

The metric above have an objective to increase RSSD and chain member operational performance and also service quality level. The metric shows the responsibilities for all chain members and support business process transparency. The initiatives that show from the metric would be monitoring by principal and chain members and would be quarterly basis review.

RSSD Business Model

A business model describes the rationale of how an organization creates, delivers, and captures value. Deliver the value proposition to the

customer is the main objective of RSSD business activities. The RSSD business model are presented in Figure 10.

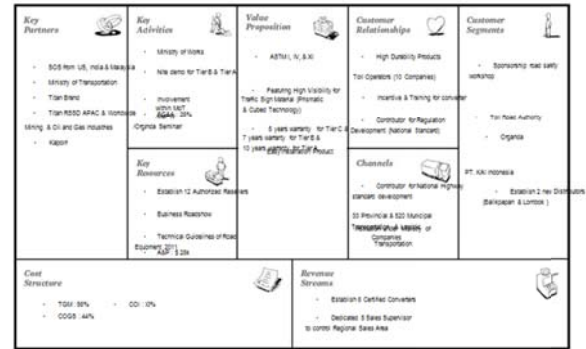


Figure 10. RSSD Business Model (Proposed, 2012)

The business activities are not only responsibilities by principal but also responsibilities of the channels. The business model is guidance for all chain members to review and monitor the action plan.

Chain Members Forecast Tools

The forecast tools purpose to minimize lack of forecast accuracy in terms of determine the market needs and wants. Forecast collaboration between chain members and principal will solve the lack of product availability in the market and also to avoid slow, excess, and dead inventory. Collaboration system will prevent the non-working inventory by: Controlling stock by two way communication; Compression of lead time; Determine the appropriate safety stock levels; Manage MOQ in efficient level; Better planning in anticipation of changes in customer demands; Customer focused & should stream line with business strategy. The chain members will submit the forecast every month to the principal (until next 3 month forecast) and would update regularly (monthly basis).

Marketing Collaboration Program

In 2011, all marketing activities handled by RSSD (principal) but for 2012, RSSD shared the responsibilities to all channels. The responsibility transformation for channels in 2012 will show with following figure (Figure 11).

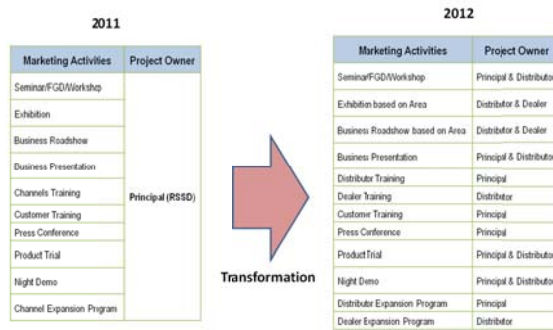


Figure 11. Responsibility Transformation of Marketing Program (Proposed, 2012)

Develop Information Sharing System

Information sharing enables the chain members to capture, store, and provide information required for ensuring effective decision making (Simatupang and Sridharan, 2002). The chain members become able to gain adequate visibility to monitor and control the progress of products as they pass through each process in the supply chain. Information sharing is a commitment between parties to share the information in terms of clearly defines the market situation and market needs to gain potential revenue. There are several information that should be shared between channels and principal as follows: Stock Information; Project Projection update; Competitor Movement update; Sales and Operational report.

Table 6 Channels Performance Indicator (Proposed, 2012)

Channels Performance Indicators		
Parameters	Performance Index	Explanation
Sales Target for 2012 --> \$/Month	70%	Monthly Sales Target (Meet Monthly OP 100% to complete the index)
Customer Visit Database	5%	Detail customer database & progress
Sales Report	10%	Reporting (Status, Update planning, Result)
Sales Planning & Strategy	10%	Clearly Sales Strategy & Target
Attitude & Team Work	5%	Good working behavior
	100%	

Table 7 Performance Evaluation Form of Channels (Proposed, 2012)

Performance Evaluation Form of Channels					
No	Target & Result	Score	Evaluator		
I.	Salest Target:	1	Division Manager		
	* Meet OP In "Month" \$				
	1. Market: \$	2			
	2. Market: \$				
	Result:	3			
	* Actual sales in "Month" :				
	1. Market: \$				
Weighted	2. Market: \$	4			
70%		Achievement (Score x Weighted)			
II.	Customer Visit Database:	1	Division Manager		
	* Number of Customer Visit Target & Database :	2			
	Result:	3			
	* Number of Actual Customer Visit & Database :	4			
	Weighted	* Number of Actual Customer Visit & Database :			
5%		Achievement (Score x Weighted)			
III.	Quality of Comprehensive Sales Report Execution, Result)	(Planning,	1	Division Manager	
			2		
			3		
			4		
	Weighted				
10%		Achievement (Score x Weighted)			
IV.	Sales Planning & Strategy		1	Division Manager	
			2		
			3		
			4		
	Weighted				
10%		Achievement (Score x Weighted)			
V.	Soft Skills Quality		1	Division Manager	
			2		
			3		
			4		
	Weighted				
5%		Achievement (Score x Weighted)			
Channels Performance Value		(Month - 2012)		#VALUE!	
Indicator Dimension:					
1. Less -> <60% from Company OP					
2. Adequate -> 60% - 90% from Company OP					
3. Good -> 90% - 120% from Company OP					
4. Excellent -> >120% from Company OP					

Develop Decision Synchronization System

Decision synchronisation seeks means of facilitating the coordination of planning and execution decisions between the participating members (Simatupang et al., 2002). Independent decision making often contributes to the sub-optimal performance of decisions that involves independent parties, joint decision making provides synergistic benefits to the chain members (Fisher, 1997; Lee et al., 1997). Decision synchronisation also relates to a trade-off between centralisation (control, individual authority) and decentralisation. The commitment must be depth understanding between principal and channels not only to execute the market with collaboration strategy but also to share of risk. The product mix transformation for RSSD product in 2012 will be show in Figure 12.



Figure 12 Product Mix Transformation of RSSD (Analysis and in Depth Interview with RSSD Division Manager, 2012)

Related to Channels Performance Indicator, the OP target for every channel related to the principal OP target. The principal OP regarding

to the product mix that already given from APAC RSSD Business Development Manager in the end of year 2011. To support the tight program, RSSD Channels should be commit as follows: Commitment to fulfill minimum inventory plan that stated on Authorized Distributor agreement and Authorized Reseller agreement; Commitment to share the information is one of channels performance indicator and would be appraise quarterly basis.

Develop Incentive Alignment System

Incentive alignment refers to the process of sharing costs, risks, and benefits amongst the participating members (Simatupang and Sridharan, 2002). This scheme motivates the members to act in a manner consistent with their mutual strategic objectives, including making decisions that are optimal for the overall supply chain and revealing truthful private information. It covers calculating costs, risks, and benefits as well as formulating incentive schemes such as pay-for-performance and pay-for-effort (Simatupang and Sridharan, 2002).

RSSD in the middle of 2012 announced 3 Incentive Program for Channels as follows: Channel Bonus Incentive Program; Product Warranty Program; and Titan Training Program;.

Develop Innovative Supply Chain Processes

Innovative supply chain processes refer to the extent the chain members design and implement adaptive supply chain processes that deliver products to end customers in a timely manner at lower costs. Explicit description of this element helps the chain members synchronise the entire sequence of integrated work activities required to deliver products that fulfil customer needs (Croxtan et al., 2001). The supply chain processes need to be as flexible as possible in order to respond to the variety of customer requirements at minimum costs with respect to supply capacity. To create flexibility, the chain members can redesign the distribution system, product, production process, and inventory management to be cost-effective and flexible to match supply with different conditions of customer demand (Fisher, 1997; Simchi-Levi et al., 2003).

RSSD in terms of leverage a market size must innovate in order to improve the business performance. Product availability and added value of the product is the critical point for division. To support the collaboration program

from this chapter, there are several innovative processes which can be done as follows: Cross Selling Price and Enterprise Standard Program.

IV. CONCLUSION AND IMPLEMENTATION PLAN

Conclusion

This research was conducted to give a solution to improve supply chain process for RSSD business in terms of effectiveness and efficiency business process. This research founded five (5) root causes in the supply chain process which are: Incorrect Market Data, Do not have Finished Goods product based on Converter Request, Inventory Push Program from RSSD, No Incentive Program for Converter, and Lack of Business Integration among Channels.

The root causes was come from data analysis and in depth interview with division and channels members. To resolve the root causes that founded, the collaboration in supply chain theory was adopted and develops five (5) elements of collaboration system such as collaborative performance system, information sharing, decisions synchronization, incentive alignment, and innovative supply chain process with regards of RSSD as a principal of road safety system in the market.

In order to give a comprehensive business solution for RSSD, this sub topic would formulate an action plan for mid 2012 - 2014. Having set the collaboration in the supply chain to achieve RSSD operational excellence to improving RSSD business performance would give sustainability and revenue to division. The process of formulating action plan would consist of several steps, which are: Set a roadmap to Execute the Collaboration Program for Mid 2012 – 2014; Risk and Mitigation; Scenario Planning.

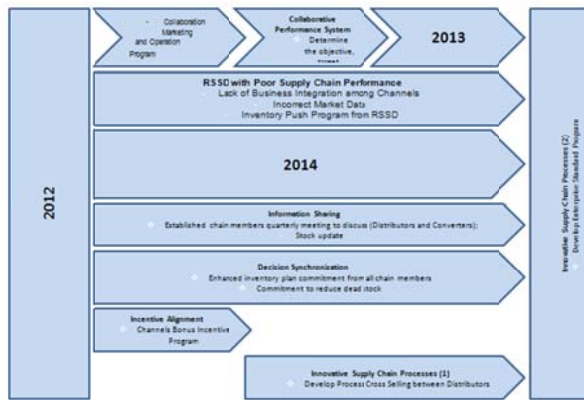


Figure 13. Road Map Plan 2012 - 2014
(Proposed, 2012)

Key Risks	Risks Description	Mitigation Actions
Organization capacity to match growth	<ul style="list-style-type: none"> Experience and skill set cannot keep up to growth expectation Systems and processes lag growth 	<ul style="list-style-type: none"> Leadership development at all levels Build functional expertise Sales & Marketing excellence Training Winning Mindset/ Winning Execution workshops
Channel capability to match growth	<ul style="list-style-type: none"> Existing channel partners have financial constraint Channel partners have competency constraints 	<ul style="list-style-type: none"> Regular channel/distributors review Reduce dependency on single large channel partners, Channel expansion Bank financing for select distributors New business models for Geographic expansion
Emerging local competitors	<ul style="list-style-type: none"> Local or regional players becoming bigger and entering Tier A Play the "cost" or "good enough" game 	<ul style="list-style-type: none"> Accelerate product development and localization for Tier B/C Value-chain analysis to develop appropriate biz. Model

Figure 14. Risk and Mitigation Plan 2012 - 2016
(Analysis and in depth interview with RSSD Division Manager, 2012)

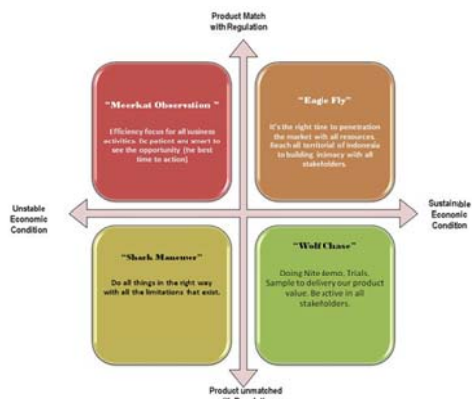


Figure 15. RSSD Scenario Planning
(Proposed, 2012)

This research shows that by implement collaboration program roadmap, the division could resolve its gaps operational activities. Moreover, RSSD should be control and monitor its collaboration improvement program for its future business sustainability. Hopefully, by implementing the result of this research, RSSD could increase its efficiency business process and ensure its Operating Plan division year by year.

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